CHROMOSOME COUNTING II

– Paul F. White

INTRODUCTION

I believe by now many of you who have taken the time for chromosome counting may either be discouraged, frustrated or elated. The mechanics are simple but may have to be modified. An uncontrollable factor is the pH (acidity) of the root tips. We all grow hibiscus under different conditions, in different soils, in different parts of the state, with different fertilizer programs and by different people. Some 'tricks' you might try to modify your techniques are:

1. Length of the warming period.
2. Strength of the ferric hydrate.
3. Length of time in the HCl.

CHROMOSOMES OF HIBISCUS

To adequately discuss hibiscus chromosomes we have to also look at the chromosomes of related genera. The diploid chromosome number, although in doubt, is a modification of the basic number 7. All probably evolved from an extinct ancestral type. Chart I from Davie (1933) reveals that a wide divergence exists.
(see page 30)

Of the 800 odd species in the Malvaceae family only about 120 species have known chromosome numbers. (Skovated 1935) This is appalling from the standpoint of the economic importance of the family.

The undisputed classic taxonomic treatment of the family is Hochreutiner. (1900) It is quite thorough and most taxonomic work in the family dates from 1900. None of the work that has been done since then, however, is as comprehensive as Hochreutiner. (Hillier 1907, Baily 1914, and Ulbrich 1921.)

Chromosome numbers for the economically important plants have been known for some time. (Zaitzev 1922. 1923, Denham 1924 and Banyji 1929) These studies actually carried the other genera along. (Youngman

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1927, Longley 1933) There was a lag during World War II and then interest picked up again in the middle fifties. Several recent papers indicate this interest is still on the rise. (Menzel and Wilson 1961, McFadden 1959)

Menzel and Wilson (1961) found in diploid Hibiscus cannabinus, 18 bivalents at metaphase I and more than 50% of the chromosomes pair as tri- or quadrivalents. Their main contribution was to genetically induce nematode resistance in Hibiscus cannabinus. (Hemp)

The hibiscus groups are very heterogenous as to cytological characteristics, however, there is yet no basis for a taxonomic classification.

In the Malvae group Althaea and Malva are, cytologically homologous genera. They are both members of the seven series. (Skovsted 1935)

Because it is pertinent at this point, I cite Skovsted (1935) and especially his summary:

"1. In the present study the chromosome numbers of about 120 species representing 25 genera of the family were found: 5,7,8,9,10,11,12,13,14,15,16,17, 18,19,21,22,25,26,28,33,35,36,38,39,42,46,56,and 65.

2, Evidence has been presented in favor of the following chromosome series:

a. a five series (5,10,15,25)
b. a six series (12,18,36)
c. a seven series (7,14,21,28,35,42,56)
d. an eleven series (11,22,33)
e. a thirteen series (13,26,39,65)

3. In most genera all species examined are members of the same chromosome series (i.e. Althaea, Pavonia, Gossypium). Some genera, however, contain different chromosome series, i.e. Abutilon (8 and 7) Malvastrum (12 and 15 series and a few numbers represented by a single specimen); and Hibiscus (11,12, (18,36) 14, (28) 17,19 and several others). The cytological groups in these genera appear to be associated with

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